



Comprehensive List of Core Content Connectors (CCCs)

**Alternate Academic Achievement Standards in
K-12 Mathematics**

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BACKGROUND of Core Content Connectors (CCCs)

To create tests appropriate for students with significant cognitive disabilities that are also aligned to the State Content Standards, South Dakota collaborated with the Multi-State Alternate Assessment (MSAA) to create a “bridge” of derived standards called the Core Content Connectors (CCCs). The CCCs were developed in English Language Arts (ELA) and Mathematics to provide guidance for state alternate assessment test item development.

OVERVIEW of Core Content Connectors (CCCs)

Core Content Connectors are only used for students with the most significant cognitive disabilities. They identify the most salient grade-level, core academic content in ELA and Mathematics found in both the [South Dakota State Standards](#) and the Learning Progression Framework (LPF). CCCs illustrate the necessary knowledge and skills to reach the learning targets within the LPF and the South Dakota State Standards, focus on the core content, knowledge, and skills needed at each grade to promote success at the next, and identify priorities in each content area to guide the instruction and alternate assessment of students with significant disabilities.

Core Content Connectors in Mathematics address the following strands at each grade level:

- Data, Analysis, Probability, and Statistics
- Geometry
- Measurement
- Numbers and Operations
- Patterns, Relations, and Functions
- Symbolic Expression

IMPLEMENTATION of Core Content Connectors (CCCs)

Teachers and Individual Education Plan (IEP) teams are encouraged to use the CCCs to guide the development of appropriate academic goals and short-term objectives that allow students the maximum engagement with the general curriculum and non-disabled peers as possible, with appropriate adaptations, simplifications, and modifications to grade-level materials and content.

When an IEP team chooses alternate assessment for a student and utilizes CCCs when developing IEP goals and short-term objectives, the IEP team should be aware of the following:

- Participation in the state alternate assessment and the use of CCCs for IEP goals affects the student’s potential to obtain a high school diploma.
- CCCs maintain the main goal of each state standard, but CCCs do not fully extend the skills or knowledge. Rather, the CCCs divide the state standards into smaller pieces.
- The state alternate assessment assesses students with significant cognitive disabilities on grade level content that has been reduced in complexity, breadth, and depth. It does not measure the full breadth of the state standards.

Mathematics CCCs linked to South Dakota State Standards in Mathematics can be found at:

<https://doe.sd.gov/assessment/alternate.aspx>

Kindergarten Mathematics Core Content Connectors
Kindergarten Math Data Analysis, Probability, and Statistics
Progress Indicator: posing questions of interest that can be answered by counting or collecting data (e.g., concrete comparisons about students, classroom materials, science topics) with teacher guidance
K.DPS.1a1 Select a question that is answered by collected data.
Kindergarten Geometry
Progress Indicator: recognizing, describing (using spatial language) and naming shapes regardless of orientation or size and locating shapes in the environment
K.GM.1a1 Recognize two-dimensional shapes (e.g., circle, square, triangle, rectangle) regardless of orientation or size.
K.GM.1a2 Recognize two-dimensional shapes in environment regardless of orientation or size.
K.GM.1a3 Use spatial language (e.g., above, below, etc.) to describe two-dimensional shapes.
Progress Indicator: composing two-dimensional shapes (rectangles, squares, triangles, half-circles, and quarter circles)
K.GM.1c 1 Compose a larger shape from smaller shapes.
Kindergarten Measurement
Progress Indicator: recognizing, identifying, and describing the measurable attributes of objects
K.ME.1a1 Describe objects in terms of measurable attributes (longer, shorter, heavier, lighter...).
Progress Indicator: comparing and ordering objects/events according to their specified attributes (using standard or non-standard units of measure), including indirectly by using a third object, or using common referents to estimate or compare
K.ME.1b1 Sort objects by characteristics (e.g., big/little, colors, shapes, etc.).
K.ME.1b2 Compare 2 objects with a measurable attribute in common to see which object has more/less of the attribute (length, height, weight).
Kindergarten Numbers and Operations
Progress Indicator: showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
K.NO.1a1 Rote count up to 10.
K.NO.1a2 Rote count up to 31.
K.NO.1a3 Rote count up to 100.
K.NO.1a4 Count up to 10 objects in a line, rectangle, or array.
Progress Indicator: developing an understanding of number and principles of quantity (e.g., hold up 5 fingers at once to show 5, locate things in 2s without counting; using number words to indicate small exact numbers or relative change in quantity - more, small)
K.NO.1b1 Match the numeral to the number of objects in a set.
K.NO.1b2 Identify the set that has more.
Progress Indicator: identifying numbers (names, symbols, quantity) and the count sequence
K.NO.1d1 Identify numerals 1-10.
K.NO.1d2 Identify the numerals 1-10 when presented the name of the number.
Progress Indicator: reading and writing numbers; counting and estimating (e.g., how many?; skip counting by 2s, 5s, 10s; even/odd)

K.NO.1e1 Write or select the numerals 1-10.
Progress Indicator: representing, ordering, and comparing whole numbers
K.NO.1f1 Identify the smaller or larger number given 2 numbers between 0-10.
Progress Indicator: representing addition and subtraction in multiple ways (composing/ decomposing numbers, diagrams, using objects, arrays, equations, number lines), including regrouping
K.NO.2a1 Count 2 sets to find sums up to 10.
K.NO.2a2 Decompose a set of up to 10 objects into a group; count the quantity in each group.
K.NO.2a3 Solve word problems within 10.
Kindergarten Patterns, Relations, and Functions
Progress Indicator: exploring and describing how addition or subtraction changes a quantity
K.PRF.1b1 Use objects or pictures to respond appropriately to "add _" and "take away _".
K.PRF.1b2 Communicate answer after adding or taking away.
Progress Indicator: modeling problem solving situations that involve addition and subtraction of whole numbers using objects, diagrams, and symbols
K.PRF.1c1 Solve one step addition and subtraction word problems, and add and subtract within 10 using objects, drawings, pictures.
Progress Indicator: recognizing, describing, and extending simple repeating (ABAB) and growing (A+1, A+2, A+3) patterns (e.g., colors, sounds, words, shapes, numeric – counting, odd, even)
K.PRF.2a1 Describe or select the repeating pattern using objects or pictures (AB or ABC).
K.PRF.2a2 Extend a repeating pattern using objects or pictures (AB or ABC).
K.PRF.2a3 Extend a repeating numerical AB pattern.
Progress Indicator: creating and explaining repeating and growing patterns using objects or numbers
K.PRF.2b1 Create a repeating pattern using objects, pictures, or numbers.

1st grade Mathematics Core Content Connectors

1st Grade Math Data Analysis, Probability, and Statistics

Progress Indicator: posing questions of interest that can be answered by counting or collecting data (e.g., concrete comparisons about students, classroom materials, science topics) with teacher guidance

1.DPS.1a2 Select questions that ask about "How many" and represent up to three categories that can be concretely represented.

1.DPS.1a3 Identify 2 categories resulting from a selected question.

1.DPS.1a4 Analyze data by sorting into 2 categories; answer questions about the total number of data points and how many in each category.

Progress Indicator: collecting and organizing/representing data (e.g., picture graphs, tally charts, bar graphs)

1.DPS.1c1 Using a picture graph, represent each object/person counted on the graph (1:1 correspondence) for 2 or more categories.

Progress Indicator: recognizing that data can take on different values

1.DPS.1d1 Interpret a picture graph to answer questions about how many in each category.

Progress Indicator: describing and comparing data and beginning to identify what the data do or do not show (e.g., bar graphs, line plots, picture graphs)

1.DPS.1e1 Compare the values of the 2 categories of data in terms of more or less.

1st Grade Geometry

Progress Indicator: analyzing and comparing two- (and later) three-dimensional shapes using informal language (e.g., flat, solid, corners) to describe their differences and similarities, as well as their component parts (number of sides, vertices) and other attributes (e.g., sides of equal length)

1.GM.1b1 Identify shapes as two-dimensional (lying flat) or three dimensional (solid).

1.GM.1b2 Distinguish two-dimensional shapes based upon their defining attributes (i.e., size, corners, and points).

Progress Indicator: composing two-dimensional shapes (rectangles, squares, triangles, half-circles, and quarter circles)

1.GM.1c 2 Compose two- and three-dimensional shapes.

Progress Indicator: partitioning shapes into 2, 3, or 4 equal parts and describing the parts (halves, quarters, fourths, thirds)

1.GM.1f1 Partition circles and rectangles into two equal parts.

1st Grade Measurement

Progress Indicator: recognizing, identifying, and describing the measurable attributes of objects

1.ME.1a2 Identify minutes and hours on a digital clock.

Progress Indicator: comparing and ordering objects/events according to their specified attributes (using standard or non-standard units of measure), including indirectly by using a third object, or using common referents to estimate or compare

1.ME.1b3 Order up to 3 objects based on a measurable attribute (height, weight, length).

1.ME.1b4 Compare the lengths of two objects indirectly by using a third object.

Progress Indicator: recognizing that the smaller the unit, the more units are needed to measure an object, and that units can be decomposed/ partitioned into smaller units

1.ME.1c1 Compare 2 units of measurement and identify which unit would require more or less when measuring a selected object (e.g., Measure with paper clips or markers? Which unit will require more to measure the table?).
Progress Indicator: applying non-standard and common standard units to measure (length, height, weight, time)
1.ME.2a1 Measure using copies of one object to measure another.
1.ME.2a2 Use time to sequence up to 3 events, using a digital or analog clock.
Progress Indicator: selecting tools and using units of measures appropriately and consistently, with no gaps or overlaps in the technique of measuring
1.ME.2b1 Express length of an object as a whole number of lengths unit by laying multiple copies of a shorter object end to end.
1st Grade Numbers and Operations
Progress Indicator: showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
1.NO.1a5 Rote count up to 31.
1.NO.1a6 Rote count up to 100.
1.NO.1a7 Count forward beginning from any given number below 10.
1.NO.1a8 Count up to 31 objects in a line, rectangle, or array.
Progress Indicator: developing an understanding of number and principles of quantity (e.g., hold up 5 fingers at once to show 5, locate things in 2s without counting; using number words to indicate small exact numbers or relative change in quantity - more, small)
1.NO.1b3 Compare 2 sets and identify the set that is either greater than or less than the other set.
Progress Indicator: developing number line skills (linear representations) using 0 to 20, and later 0 to 100
1.NO.1c1 Use a number line to count up to 31 objects by matching 1 object per number.
Progress Indicator: identifying numbers (names, symbols, quantity) and the count sequence
1.NO.1d3 Identify numerals 0-31.
1.NO.1d4 Identify the numeral up to 31 when presented the name.
Progress Indicator: reading and writing numbers; counting and estimating (e.g., "how many"; skip counting by 2s, 5s, 10s; even/odd)
1.NO.1e2 Write or select the numerals 0-31.
Progress Indicator: representing, ordering, and comparing whole numbers
1.NO.1f2 Order up to 3 sets that have up to 10 objects in each set.
1.NO.1f3 Order up to 3 sets with up to 20 objects in each set.
1.NO.1f4 Order up to 3 numbers up to 31.
1.NO.1f5 Identify the smaller or larger number given 2 numbers between 0-31.
Progress Indicator: applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
1.NO.1h1 Build representations of numbers up to 19 by creating a group of 10 and some 1s (e.g., 13 = one 10 and three 1s).
1.NO.1h2 Identify the value of the numbers in the tens and ones place within a given number up to 31.

1.NO.1h3 Compare two-digit numbers up to 31 using representations and numbers (e.g., identify more tens, less tens, more ones, less ones, larger number, smaller number).
Progress Indicator: recognizing zero as an additive identity, origin for the number line, and representing no units as a quantity or in place value
1.NO.1i1 Recognize zero as representing none or no objects.
1.NO.1i2 Recognize zero as an additive identity.
Progress Indicator: representing addition and subtraction in multiple ways (composing/ decomposing numbers, diagrams, using objects, arrays, equations, number lines), including regrouping
1.NO.2a4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record or select the answer.
1.NO.2a5 Count 2 sets to find sums up to 10.
1.NO.2a6 Count 2 sets to find sums up to 20.
1.NO.2a7 Decompose a set of up to 10 objects into a group; count the quantity in each group.
1.NO.2a8 Decompose a set of up to 20 objects into a group; count the quantity in each group.
1.NO.2a9 Use manipulatives or representations to write simple addition or subtraction equations within 20 based upon a word problem.
1.NO.2a10 Use data presented in graphs (i.e., pictorial, object) to solve one step "how many more" or "how many less" word problems.
1.NO.2a11 Solve word problems within 20.
Progress Indicator: working flexibly with common addition and subtraction situations
1.NO.2c1 Identify and apply addition and equal signs.
Progress Indicator: exploring and explaining answers to questions, such as "Does this answer make sense?"
1-2.NO.3a1 Identify the problem within a word problem (e.g., "Bill had two apples. Sam gave Bill two more apples. How many apples does Bill have now?" - student underlines "How many apples does Bill have now?").
1-2.NO.3a2 Make sense of and solve story word problems.
1-2.NO.3a3 Use a given strategy to check solutions (e.g., use addition to check an answer to a subtraction problem).
Progress Indicators: constructing arguments using concrete referents such as objects, diagrams, tables, actions (e.g., clapping, movement) and estimating
1-2.NO.3b1 Use an appropriate tool to help solve a given problem (e.g., use a ruler to measure in inches).
1-2.NO.3b2 Use a strategy, rule, or identified characteristic to solve a given routine or non-routine problem (e.g., sort given shapes based upon the rule that triangles have three corners; inches are smaller units than feet so use inches to measure smaller items such as a pencil).
1st Grade Patterns, Relations, and Functions
Progress Indicator: exploring and describing how addition or subtraction changes a quantity
1.PRF.1b3 Using objects or pictures respond appropriately to "add _" and "take away _".
Progress Indicator: modeling problem solving situations that involve addition and subtraction of whole numbers using objects, diagrams, and symbols
1.PRF.1c2 Solve one step addition and subtraction word problems where the change or result is unknown ($4 + _ = 7$) or ($4 + 3 = _$), within 20 using objects, drawings, pictures.

Progress Indicator: recognizing, describing, and extending simple repeating (ABAB) and growing (A+1, A+2, A+3) patterns (e.g., colors, sounds, words, shapes, numeric – counting, odd, even)

1.PRF.2a4 Use a number line to extend the numerical patterns that grow at a constant rate (2, 4, 6, 8).

Progress Indicator: creating and explaining repeating and growing patterns using objects or numbers

1.PRF.2b2 Create a growing pattern using numbers or objects.

Progress Indicator: extending and analyzing simple numeric patterns with rules that involve addition and subtraction

1.PRF.2c1 Identify the rule of a given arithmetic pattern.

2nd Grade Mathematics Core Content Connectors

2nd Grade Data Analysis, Probability, and Statistics

Progress Indicator: posing questions of interest that can be answered by counting or collecting data (e.g., concrete comparisons about students, classroom materials, science topics) with teacher guidance

2.DPS.1a5 Select a question about 3 attributes that can be concretely represented.

2.DPS.1a6 Identify up to 3 categories resulting from a selected question.

2.DPS.1a7 Analyze data by sorting into categories established by each question.

2.DPS.1a8 Interpret the number of points in each category.

Progress Indicator: collecting and organizing/representing data (e.g., picture graphs, tally charts, bar graphs)

2.DPS.1c2 Organize data by representing categorical data on a pictorial graph or bar graph.

2.DPS.1c3 Organize data by representing continuous data on a line plot.

Progress Indicator: recognizing that data can take on different values

2.DPS.1d2 Identify the value of each category represented on picture graph and bar graph or each point on a line plot.

Progress Indicator: describing and comparing data and beginning to identify what the data do or do not show (e.g., bar graphs, line plots, picture graphs)

2.DPS.1e2 Compare the information shown in a bar graph or picture graph with up to 4 categories. Solve simple comparisons of how many more or how many less.

2nd Grade Geometry

Progress Indicator: recognizing, describing (using spatial language) and naming shapes regardless of orientation or size and locating shapes in the environment

2.GM.1a4 Identify two-dimensional shapes such as rhombus, pentagons, hexagons, octagon, ovals, equilateral, isosceles, and scalene triangles.

Progress Indicator: analyzing and comparing two- (and later) three-dimensional shapes using informal language (e.g., flat, solid, corners) to describe their differences and similarities, as well as their component parts (number of sides, vertices) and other attributes (e.g., sides of equal length)

2.GM.1b3 Distinguish two- or three- dimensional shapes based upon their attributes (i.e., # of sides, equal or different lengths of sides, # of faces, # of corners).

Progress Indicator: composing three-dimensional shapes, using concrete models/materials (cubes, prisms, cones, and cylinders)

2.GM.1d1 Compose three- dimensional shapes.

Progress Indicator: drawing and identifying shapes with specific attributes (e.g., number of sides or equal angles) not determined by direct measuring

2.GM.1e1 Draw two-dimensional shapes with specific attributes.

Progress Indicator: partitioning shapes into 2, 3, or 4 equal parts and describing the parts (halves, quarters, fourths, thirds)

2.GM.1f2 Partition circles and rectangles into 2 and 4 equal parts.

2.GM.1f3 Label a partitioned shape (e.g., one whole rectangle was separated into 2 halves, one whole circle was separated into three thirds).

2nd Grade Measurement

Progress Indicator: recognizing, identifying, and describing the measurable attributes of objects
2.ME.1a3 Select appropriate tool and unit of measurement to measure an object (ruler or yard stick; inches or feet).
2.ME.1a4 Solve word problems using dollar bills, quarters, dimes, nickles, or pennies.
2.ME.1a5 Tell time to the nearest½ hour using digital clocks.
Progress Indicator: comparing and ordering objects/events according to their specified attributes (using standard or non-standard units of measure), including indirectly by using a third object, or using common referents to estimate or compare
2.ME.1b5 Solve word problems involving the difference in standard length units.
Progress Indicator: recognizing that the smaller the unit, the more units are needed to measure an object, and that units can be decomposed/ partitioned into smaller units
2.ME.1c2 Measure the attributes (length, width, height) of an object using 2 different size units.
2.ME.1c3 Recognize that standard measurement units can be decomposed into smaller units.
Progress Indicator: applying non-standard and common standard units to measure (length, height, weight, time)
2.ME.2a3 Estimate the length of an object using units of feet and inches.
2.ME.2a4 Solve one step subtraction problems involving the difference of the lengths of 2 objects in standard length units.
Progress Indicator: selecting tools and using units of measures appropriately and consistently, with no gaps or overlaps in the technique of measuring
2.ME.2b2 Select appropriate tools and demonstrate or identify appropriate measuring techniques.
Progress Indicator: recognizing situations that require precision and those where an estimation or proportional matching is appropriate
2.ME.2c1 Determine whether a situation calls for a precise measurement or an estimation.
2nd Grade Numbers and Operations
Progress Indicator: showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
2.NO.1a9 Rote count up to 100.
Progress Indicator: identifying numbers (names, symbols, quantity) and the count sequence
2.NO.1d5 Identify numerals 0-100.
2.NO.1d6 Identify the numeral between 0 and 100 when presented the name.
Progress Indicator: reading and writing numbers; counting and estimating (e.g., how many?; skip counting by 2s, 5s, 10s; even/odd)
2.NO.1e3 Write or select the numerals 0-100.
2.NO.1e4 Skip count by 5s.
2.NO.1e5 Skip count by 10s.
2.NO.1e6 Skip count by 100s.
2.NO.1e7 Identify numbers as odd or even.
2.NO.1e8 Mentally add or subtract 10 from a given set from the 10s family (e.g., what is 10 more than 50? What is 10 less than 70?).
2.NO.1e9 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is 100 less than 700?).

Progress Indicator: representing, ordering, and comparing whole numbers
2.NO.1f6 Compare (greater than, less than, equal to) 2 numbers up to 100.
Progress Indicator: applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
2.NO.1h4 Build representations of 3-digit numbers using tens and ones.
2.NO.1h5 Build representations of 3-digit numbers using hundreds, tens, and ones.
2.NO.1h6 Compare 2-digit numbers using representations and numbers (e.g., identify more tens, less tens, more ones, less ones, larger number, smaller number).
2.NO.1h7 Compare 3-digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number).
2.NO.1h8 Write or select expanded form for any 2-digit number.
2.NO.1h9 Write or select expanded form for any 3-digit number.
Progress Indicator: recognizing zero as an additive identity, origin for the number line, and representing no units as a quantity or in place value
2.NO.1i3 Explain what the zero represents in place value (hundreds, tens, ones) in a number.
Progress Indicator: representing addition and subtraction in multiple ways (composing/ decomposing numbers, diagrams, using objects, arrays, equations, number lines), including regrouping
2.NO.2a12 Model addition and subtraction with base 10 blocks within 20.
2.NO.2a13 Model addition and subtraction with base 10 blocks within 50.
2.NO.2a14 Model addition and subtraction with base 10 blocks within 100.
2.NO.2a15 Remove objects from a set in a subtraction situation to find the amount remaining up to a minuend of 20.
2.NO.2a16 Solve word problems within 20.
2.NO.2a17 Solve word problems within 100.
2.NO.2a18 Use diagrams and number lines to solve addition or subtraction problems.
2.NO.2a19 Combine up to 3 sets of 20 or less.
Progress Indicator: explaining or modeling the relationship between addition and subtraction
2.NO.2b1 Use commutative properties to solve addition problems with sums up to 20 (e.g., $3 + 8 = 11$ therefore $8 + 3 = \underline{\quad}$).
2.NO.2b2 Use associative property to solve addition problems with sums up to 20.
Progress Indicator: working flexibly with common addition and subtraction situations
2.NO.2c2 Identify and apply addition, subtraction, and equal signs.
2.NO.2c3 Compose ones into tens and/or tens into hundreds in addition situation.
2.NO.2c4 Decompose tens into ones and/or hundreds into tens in subtraction situations.
Progress Indicator: exploring and explaining answers to questions, such as "Does this answer make sense?"
1-2.NO.3a1 Identify the problem within a word problem (e.g., "Bill had two apples. Sam gave Bill two more apples. How many apples does Bill have now?" - student underlines "How many apples does Bill have now?").
1-2.NO.3a2 Make sense of and solve story word problems.
1-2.NO.3a3 Use a given strategy to check solutions (e.g., use addition to check an answer to a

subtraction problem).
Progress Indicators: constructing arguments using concrete referents such as objects, diagrams, tables, actions (e.g., clapping, movement) and estimating
1-2.NO.3b1 Use an appropriate tool to help solve a given problem (e.g., use a ruler to measure in inches).
1-2.NO.3b2 Use a strategy, rule, or identified characteristic to solve a given routine or non-routine problem (e.g., sort given shapes based upon the rule that triangles have three corners; inches are smaller units than feet so use inches to measure smaller items such as a pencil).
2nd Grade Patterns, Relations, and Functions
Progress Indicator: modeling problem solving situations that involve addition and subtraction of whole numbers using objects, diagrams, and symbols
2.PRF.1c3 Solve one or two step addition and subtraction problems, and add and subtract within 100, using objects, drawings, pictures.
2.PRF.1c4 Use pictures, drawings, or objects to represent the steps of a problem.
2.PRF.1c5 Write or select an equation representing the problem and its solution.
Progress Indicator: recognizing, describing, and extending simple repeating (ABAB) and growing (A+1, A+2, A+3) patterns (e.g., colors, sounds, words, shapes, numeric – counting, odd, even)
2.PRF.2a6 Use a number line to extend the numerical patterns that grow at a constant rate (2, 4, 6, 8).
Progress Indicator: creating and explaining repeating and growing patterns using objects or numbers
2.PRF.2b3 Use a number line to extend arithmetic patterns that are decreasing.
Progress Indicator: extending and analyzing simple numeric patterns with rules that involve addition and subtraction
2.PRF.2c2 Identify the rule of arithmetic patterns that are increasing.
2.PRF.2c3 Identify the rule of arithmetic patterns that are decreasing.
2nd Grade Symbolic Expression
Progress Indicator: using symbols ($=$, $>$, $<$) to compare whole number quantities, write equations, and determine if equations are true
2.SE.1c1 Compare sets and use appropriate symbol to label the first as $=$, $<$, or $>$ the second set.
2.SE.1c2 Label simple equations as $=$ or with the phrase not equal.
Progress Indicator: representing addition and subtraction in multiple formats, including expressions
2.SE.1d1 Represent addition of 2 sets when shown the "+" symbol.
2.SE.1d2 Represent a "taking away" situation with the "-" symbol.

3rd Grade Mathematics Core Content Connectors

3rd Grade Data Analysis, Probability, and Statistics

Progress Indicator: formulating questions and designing investigations (defining measures and variables)

3.DPS.1f1 Develop questions, make a plan for data collection.

Progress Indicator: collecting data and representing data (e.g., bar graphs, frequency tables, line plots)

3.DPS.1g1 Collect data, organize into picture or bar graph.

3.DPS.1g2 Organize measurement data into a line plot.

Progress Indicator: describing data shapes and what the data representations do and do not show (bar graphs, picture graphs, frequency tables, line plots, circle graphs) including the attributes used

3.DPS.1i1 Select the appropriate statement that describes the data representations based on a given graph (picture, bar, line plots).

Progress Indicator: using data to make and support claims and interpretations (e.g., making comparisons among individuals, between individuals and the group, and among groups)

3.DPS.1k1 Apply results of data to a real-world situation.

3rd Grade Geometry

Progress Indicator: describing, analyzing, comparing, and classifying two-dimensional figures (triangles, quadrilaterals) using shared attributes

3.GM.1h1 Identify shared attributes of shapes.

Progress Indicator: partitioning shapes into equal parts with equal areas and recognizing that each part is a unit fraction of the whole

3.GM.1i1 Partition rectangles into equal parts with equal area.

3rd Grade Measurement

Progress Indicator: recognizing, identifying, and describing the measurable attributes of objects

3.ME.1a1 Tell time to the nearest 5 minutes using a digital clock.

3.ME.1a2 Solve word problems involving the addition and subtraction of time intervals of whole hours or within an hour (e.g., whole hours: 5:00 to 8:00, within hours: 7:15 to 7:45).

Progress Indicator: describing and demonstrating: unit attributes, iterating, tiling, identical units, number line intervals, standardization, proportionality, additivity, and origin

3.ME.1d1 Use tiling and addition to determine area.

3.ME.1d2 Measure area of rectilinear figures by counting squares.

Progress Indicator: selecting the appropriate unit for measuring a given attribute (length, area, mass, liquid volume, size of angle), recognizing that a unit must have the same attributes as the object (e.g., unit of length must measure an object that has length)

3.ME.1f1 Select appropriate units for measurement (liquid volume, area, time, money).

3.ME.1f2 Add to solve 1 step word problems.

Progress Indicator: exploring what happens to 2-dimensional measurements (perimeter or area) when the dimensions of the figure are changed

3.ME.1g1 Identify a figure as getting larger or smaller when the dimensions of the figure change.

Progress Indicator: selecting and applying appropriate customary or metric units and tools to measure or estimate (liquid volume, mass, perimeter, area, time, and angles)

3.ME.2e1 Select appropriate tool for measurement: liquid volume, area, time, money.
3.ME.2e2 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch.
3.ME.2e3 Measure to solve problems using number lines and ruler to 1 inch, $\frac{1}{2}$ inch, or $\frac{1}{4}$ of an inch.
Progress Indicator: using a variety of strategies (decomposing complex shapes, using counting strategies, arrays, formulas) to estimate or measure area and perimeter (including irregular shapes/objects)
3.ME.2h1 Use addition to find the perimeter of a rectangle.
3.ME.2i1 Estimate liquid volume.
3rd Grade Numbers and Operations
Progress Indicator: reading and writing numbers; counting and estimating (e.g., how many?; skip counting by 2s, 5s, 10s; even/odd)
3.NO.1e1 Skip count by 100s.
3.NO.1e2 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is 100 less than 700?).
Progress Indicator: applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
3.NO.1h1 Compare 3-digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number).
Progress Indicator: applying place value concepts to: read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place
3.NO.1j1 Build representations of numbers using hundreds, tens and ones.
3.NO.1j2 Write or select the expanded form for up to 3-digit number.
3.NO.1j3 Use place value to round to the nearest 10 or 100.
3.NO.1j4 Use rounding to solve word problems.
Progress Indicator: identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers
3.NO.1i1 Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles).
3.NO.1i2 Identify the total number of parts (denominator) of a given representation (rectangles and circles).
3.NO.1i3 Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, eighths).
3.NO.1i4 Identify that a part of a rectangle can be represented as a fraction that has a value between 0 and 1.
3.NO.1i5 Locate given common unit fractions (i.e., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{e}$) on a number line or ruler.
Progress Indicator: explaining or modeling the relationship between addition and subtraction
3.NO.2b1 Use the relationships between addition and subtraction to solve problems.
Progress Indicator: working flexibly with common addition and subtraction situations
3.NO.2c1 Solve multi-step addition and subtraction problems up to 100.
Progress Indicator: modeling multiplication (equal-sized groups, arrays, area models, equal-sized jumps on number lines, multiplicative comparisons) and division (successive subtraction, partitioning,

sharing) of whole numbers
3.NO.2d1 Find the total number of objects when given the number of identical groups and the number of objects in each group neither number larger than 5.
3.NO.2d2 Find total number inside an array with neither number in the columns or rows larger than 5.
3.NO.2d3 Solve multiplication problems with neither number greater than 5.
3.NO.2d4 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 5.
3.NO.2d5 Determine the number of groups given the total number of objects and the number of objects in each group where the number in each group and the number of groups is not greater than 5.
Progress Indicator: describing relationships between addition-multiplication; multiplication-division; addition-subtraction; why commutative property does not apply to subtraction or division
3.NO.2e1 Solve or solve and check one or two step word problems requiring addition, subtraction, or multiplication with answers up to 100.
Progress Indicator: evaluating the reasonableness of answers using mental computation, arithmetic patterns, and estimation strategies, including rounding to the nearest 10 or 100
3-4.NO.3c1 Solve real world problems (e.g., determine how many nickels needed to be the equivalent of a quarter) by using mental math (such as skip counting by 2s within 20, 5s within 50, 10s within 100).
3-4.NO.3c2 Evaluate the reasonableness of answers after making computations.
3-4.NO.3c3 Determine the reasonableness of answers using estimation.
3-4.NO.3c4 Determine the reasonableness of answers using arithmetic patterns.
3-4.NO.3d1 Use modeling or diagrams to construct or select a viable argument for a given problem (e.g., "what is the difference between equilateral, scalene, and isosceles triangles?" and use models of triangles to illustrate correct answer).
3-4.NO.3d2 Use models to find equivalencies or solutions.
3-4.NO.3d3 Justify and label solutions as a result of making a comparison (e.g., compare 15 and 25 and label 25 as greater: $15 < 25$).
3-4.NO.3d4 Explain why a tool or strategy would be used to solve a given problem.
3rd Grade Patterns, Relations, and Functions
Progress Indicator: describing and modeling how addition, subtraction, multiplication, or division changes a quantity, including with fractions
3.PRF.1d1 Use objects to model multiplication and division situations involving up to 5 groups with up to 5 objects in each group and interpret the results.
Progress Indicator: using representations (tables, graphs, equations) to show how values of one quantity are related to values of another and to draw conclusions
3.PRF.1e1 Describe the rule for a numerical pattern (e.g., increase by 2, 5 or 10).
3.PRF.1e2 Select or name the 3 next terms in a numerical pattern where numbers increase by 2, 5 or 10.
Progress Indicator: representing and explaining equivalence concretely, graphically, and symbolically (equations, rules)

3.PRF.1f1 Determine the equivalence between number of minutes and the fraction of the hour (e.g., 30 minutes = $\frac{1}{2}$ hour).

3.PRF.1f2 Determine the equivalence between the number of minutes and the number of hours (e.g., 60 minutes = 1 hour).

Progress Indicator: representing and analyzing patterns and rules (e.g., doubling, adding 3) using words, tables, graphs, and models

3.PRF.2d1 Identify multiplication patterns in a real-world setting.

3.PRF.2d2 Apply properties of operations as strategies to multiply and divide.

3rd Grade Symbolic Expression

Progress Indicator: using symbols ($=$, $>$, $<$) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations

3.SE.1g1 Use $=$, $<$, or $>$ to compare 2 fractions with the same numerator or denominator.

4th Grade Mathematics Core Content Connectors

4th Grade Data Analysis, Probability, and Statistics

Progress Indicator: formulating questions and designing investigations (defining measures and variables)

4.DPS.1f2 Develop questions, make a plan for data collection.

Progress Indicator: collecting data and representing data (e.g., bar graphs, frequency tables, line plots)

4.DPS.1g3 Collect data, organize in graph (e.g., picture graph, line plot, bar graph).

Progress Indicator: describing data shapes and what the data representations do and do not show (bar graphs, picture graphs, frequency tables, line plots, circle graphs) including the attributes used

4.DPS.1i1 Select the appropriate statement that describes the data representations based on a given graph (picture, bar, line plots).

Progress Indicator: identifying clumps, gaps, trends, or central tendency (mode, median) in the data

4.DPS.1j1 Select an appropriate statement that describes the most frequent or the least frequent data point using a line plot, picture graph, or bar graph.

Progress Indicator: using data to make and support claims and interpretations (e.g., making comparisons among individuals, between individuals and the group, and among groups)

4.DPS.1k2 Apply results of data to a real-world situation.

4th Grade Geometry

Progress Indicator: describing, analyzing, comparing, and classifying two-dimensional figures (triangles, quadrilaterals) using shared attributes

4.GM.1h2 Classify two-dimensional shapes based on attributes (# of angles).

Progress Indicator: recognizing and drawing points, lines, line segments, rays, angles, and perpendicular and parallel lines and identifying these in plane figures

4.GM.1j1 Recognize a point, line and line segment, rays in two-dimensional figures.

4.GM.1j2 Recognize perpendicular and parallel lines in two-dimensional figures.

4.GM.1j3 Recognize an angle in two-dimensional figures.

4.GM.1j4 Categorize angles as right, acute, or obtuse.

Progress Indicator: recognizing and drawing lines of symmetry in a variety of figures

4.GM.1k1 Recognize a line of symmetry in a figure.

4th Grade Measurement

Progress Indicator: describing and demonstrating: unit attributes, iterating, tiling, identical units, number line intervals, standardization, proportionality, additivity, and origin

4.ME.1d3 Use tiling and multiplication to determine area.

Progress Indicator: selecting the appropriate unit for measuring a given attribute (length, area, mass, liquid volume, size of angle), recognizing that a unit must have the same attributes as the object (e.g., unit of length must measure an object that has length)

4.ME.1f3 Select appropriate units for measurement: mass, length, angles.

4.ME.1f4 Select appropriate units for the value of a set of coins or dollars.

Progress Indicator: exploring what happens to 2-dimensional measurements (perimeter or area) when the dimensions of the figure are changed

4.ME.1g2 Solve word problems using perimeter and area where changes occur to the dimensions of a

rectilinear figure.
Progress Indicator: selecting and applying appropriate customary or metric units and tools to measure or estimate (liquid volume, mass, perimeter, area, time, and angles)
4.ME.2e4 Select appropriate tool for measurement: mass, length, angles.
4.ME.2e5 Construct a given angle.
4.ME.2e6 Measure right angles using a tool (e.g., angle ruler, protractor).
Progress Indicator: recognizing relative sizes of units of measure and making simple conversions within systems when solving problems (e.g., 12 in. = 1 ft)
4.ME.2f1 Complete a conversion table for length and mass within a single system.
Progress Indicator: recognizing situations that require precision (money, time, distances, fractions, decimals) and those where an estimation is appropriate
4.ME.2g1 Determine whether a situation calls for a precise measurement or an estimation (distance, volume, mass, time, money).
Progress Indicator: using a variety of strategies (decomposing complex shapes, using counting strategies, arrays, formulas) to estimate or measure area and perimeter (including irregular shapes/objects)
4.ME.2h1 Apply the formulas for area and perimeter to solve real world problems.
4th Grade Numbers and Operations
Progress Indicator: applying place value concepts to: read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place
4.NO.1j5 Use place value to round to any place (i.e., ones, tens, hundreds, thousands).
4.NO.1j6 Compare multi-digit numbers using representations and numbers.
4.NO.1j7 Write or select the expanded form for a multi-digit number.
Progress Indicator: explaining the meaning of place value (that one digit in one place represents 10 times what it represents in the place to its right)
4.NO.1k1 Compare the value of a number when it is represented in different place values of two 3-digit numbers.
Progress Indicator: identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers
4.NO.1l6 Locate fractions on a number line.
4.NO.1l7 Order fractions on a number line.
Progress Indicator: composing and representing equivalent fractions in the form a/b
4.NO.1m1 Determine equivalent fractions.
Progress Indicator: comparing and modeling fractions, including with different denominators
4.NO.1n1 Select a model of a given fraction (halves, thirds, fourths, sixths, eighths).
4.NO.1n2 Compare up to 2 given fractions that have different denominators.
Progress Indicator: rewriting fractions as equivalent decimals
4.NO.1o1 Match a fraction with a denominator of 10 or 100 as a decimal ($5/10 = .5$).
4.NO.1o2 Find the equivalent decimal for a given fraction.
Progress Indicator: using number words to indicate decimal values (tenths, hundredths)
4.NO.1p1 Read, write, or select decimals to the tenths place.
4.NO.1p2 Read, write, or select decimals to the hundredths place.

Progress Indicator: using and comparing decimals to the hundredths
4.NO.1q1 Compare two decimals to the tenths place with a value of less than 1.
4.NO.1q2 Compare two decimals to the hundredths place with a value of less than 1.
Progress Indicator: working flexibly with common addition and subtraction situations
4.NO.2c2 Solve multi digit addition and subtraction problems up to 1000.
Progress Indicator: modeling multiplication (equal-sized groups, arrays, area models, equal-sized jumps on number lines, multiplicative comparisons) and division (successive subtraction, partitioning, sharing) of whole numbers
4.NO.2d6 Find total number inside an array with neither number in the columns or rows larger than 10.
4.NO.2d7 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 10.
4.NO.2d8 Match an accurate addition and multiplication equation to a representation.
Progress Indicator: describing relationships between addition-multiplication; multiplication-division; addition-subtraction; why commutative property does not apply to subtraction or division
4.NO.2e2 Solve or solve and check one or two step word problems requiring addition, subtraction or multiplication with answers up to 100.
Progress Indicator: identifying factors and multiples of numbers
4.NO.2f1 Identify multiples for a whole number (e.g., $2 = 2, 4, 6, 8, 10$).
4.NO.2f2 Solve multiplication problems up to two digits by one digit.
Progress Indicator: recognizing fractions as one number/one quantity, rather than two numbers (numerator and denominator) and using number lines to represent magnitude of fractions
4.NO.2g1 Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$).
Progress Indicator: adding, subtracting, and multiplying fractions, including mixed numbers
4.NO.2h1 Add and subtract fractions with like denominators of (2, 3, 4, or 8).
4.NO.2h2 Add and subtract fractions with like denominators (2, 3, 4, or 8) using representations.
4.NO.2h3 Solve word problems involving addition and subtraction of fractions with like denominators (2, 3, 4, or 8).
Progress Indicator: evaluating the reasonableness of answers using mental computation, arithmetic patterns, and estimation strategies, including rounding to the nearest 10 or 100
3-4.NO.3c1 Solve real world problems (e.g., determine how many nickels needed to be the equivalent of a quarter) by using mental math (such as skip counting by 2s within 20, 5s within 50, 10s within 100).
3-4.NO.3c2 Evaluate the reasonableness of answers after making computations.
3-4.NO.3c3 Determine the reasonableness of answers using estimation.
3-4.NO.3c4 Determine the reasonableness of answers using arithmetic patterns.
3-4.NO.3d1 Use modeling or diagrams to construct or select a viable argument for a given problem (e.g., "what is the difference between equilateral, scalene, and isosceles triangles?" and use models of triangles to illustrate correct answer).
3-4.NO.3d2 Use models to find equivalencies or solutions.
3-4.NO.3d3 Justify and label solutions as a result of making a comparison (e.g., compare 15 and 25

and label 25 as greater: $15 < 25$).
3-4.NO.3d4 Explain why a tool or strategy would be used to solve a given problem.
4th Grade Patterns, Relations, and Functions
Progress Indicator: describing and modeling how addition, subtraction, multiplication, or division changes a quantity, including with fractions
4.PRF.1d2 Use objects to model multiplication and division situations involving up to 10 groups with up to 5 objects in each group and interpret the results.
Progress Indicator: using representations (tables, graphs, equations) to show how values of one quantity are related to values of another and to draw conclusions
4.PRF.1e3 Solve multiplicative comparisons with an unknown using up to 2-digit numbers with information presented in a graph or word problem (e.g., an orange hat cost \$3. A purple hat cost 2 times as much. How much does the purple hat cost? [$3 \times 2 = 6$]).
Progress Indicator: representing and explaining equivalence concretely, graphically, and symbolically (equations, rules)
4.PRF.1f3 Apply the distributive property to solve problems with models.
4.PRF.1f4 Solve a 2-digit by 1-digit multiplication problem using 2 different strategies.
Progress Indicator: representing and analyzing patterns and rules (e.g., doubling, adding 3) using words, tables, graphs, and models
4.PRF.2d3 Generate a pattern when given a rule and word problem (I run 3 miles every day, how many miles have I run in 3 days).
Progress Indicator: extending, translating, and analyzing numeric patterns and their rules using addition, subtraction, multiplication, and division
4.PRF.2e1 Extend a numerical pattern when the rule is provided.
4th Grade Symbolic Expression
Progress Indicator: using symbols ($=$, $>$, $<$) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations
4.SE.1g2 Use $=$, $<$, or $>$ to compare 2 fractions (fractions with a denominator of 10 or less).
4.SE.1g3 Use $=$, $<$, or $>$ to compare 2 decimals (decimals in multiples of .10).
Progress Indicator: expressing whole numbers as fractions, and fractions as equivalent decimals; recognizing that a fraction is one number, not two
4.SE.1h1 Express whole numbers as fractions.
4.SE.1h2 Identify the equivalent decimal for a fraction.

5th Grade Mathematics Core Content Connectors

5th Grade Data Analysis, Probability, and Statistics

Progress Indicator: using representations (e.g., dot plots, scatter plots, line plots) to display data from investigations to describe the shapes of the data

5.DPS.1c1 Collect and graph data: bar graph, line plots, picture graph (e.g., average height among 3 classrooms, # of boys and girls).

Progress Indicator: identifying the range, three common measures of central tendency (mean, median, and mode) and interpreting the mean as a fair share and a center of balance

5.DPS.1d1 Select an appropriate statement about the range of the data for a given graph (bar graph, line plot) (i.e., range of data) up to 10 points.

Progress Indicator: making claims about populations from data distributions, supporting interpretations on the basis of mean, median, or mode, and the shape of the distribution

5.DPS.1e1 Use measures of central tendency to interpret data including overall patterns in the data.

5th Grade Geometry

Progress Indicator: describing and classifying plane figures based on their properties

5.GM.1a1 Recognize properties of simple plane figures.

Progress Indicator: recognizing and using properties belonging to categories and subcategories of plane figures (e.g., all rectangles have four right angles, so all squares are rectangles and have four right angles)

5.GM.1b1 Distinguish plane figures by their properties.

Progress Indicator: demonstrating the use of a coordinate system by locating/graphing a given point or polygon using ordered pairs

5.GM.1c1 Locate the x and y axis on a graph.

5.GM.1c2 Locate points on a graph.

5.GM.1c3 Use order pairs to graph given points.

Progress Indicator: recognizing and drawing points, lines, line segments, rays, angles, and perpendicular and parallel lines and identifying these in plane figures

5.GM.1j1 Recognize parallel and perpendicular lines within the context of two-dimensional figures.

5th Grade Measurement

Progress Indicator: identifying and describing measurable attributes (including area, surface area, volume, fractional units, absolute value with temperature), and selecting appropriate customary or metric units of measure when solving problems

5.ME.1a1 Identify the appropriate units of measurement for different purposes in a real life context (e.g., measure a wall using feet, not inches).

Progress Indicator: recognizing relationships among units and using proportional reasoning to convert measurements from one unit to another within the same system

5.ME.1b1 Convert standard measurements of time.

5.ME.1b2 Convert standard measurements of length.

5.ME.1b3 Convert standard measurements of mass.

Progress Indicator: selecting and applying appropriate standard units, tools, and level of precision in real-world measurement problems (e.g., area, surface area, volume, rate)

5.ME.2a1 Solve problems involving conversions of standard measurement units when finding area,

volume, time lapse, or mass.
Progress Indicator: using a variety of strategies (decomposing complex shapes, using formulas and models) to measure area (triangles, quadrilaterals, polygons) and volume (rectangular prisms)
5.ME.2b1 Use filling and multiplication to determine volume.
5.ME.2b2 Apply formula to solve one step problems involving volume.
5th Grade Numbers and Operations
Progress Indicator: explaining the meaning of place value (that a digit in one place represents 10 times what it represents to the place to its right).
5.NO.1a1 Compare the value of a number when it is represented in different place values of two 3-digit numbers.
Progress Indicator: extending place value understanding to reading (e.g., naming the values with number words, rather than "point four"), writing, comparing, and rounding decimals
5.NO.1b1 Read, write, or select a decimal to the hundredths place.
5.NO.1b2 Read, write, or select a decimal to the thousandths place.
5.NO.1b3 Compare two decimals to the thousandths place with a value of less than 1.
5.NO.1b4 Round decimals to the next whole number.
5.NO.1b5 Round decimals to the tenths place.
5.NO.1b6 Round decimals to the hundredths place.
Progress Indicator: using a variety of fractional and decimal representations and locating them on a number line
5.NO.1c1 Rewrite a fraction as a decimal.
5.NO.1c2 Rewrite a decimal as a fraction.
Progress Indicator: working flexibility with common addition, subtraction, multiplication, and division situations
5.NO.2a1 Solve problems or word problems using up to three-digit numbers and addition or subtraction or multiplication.
5.NO.2a2 Separate a group of objects into equal sets when given the number of sets to find the total in each set with the total number less than 50.
5.NO.2a3 Find whole number quotients up to two dividends and two divisors.
5.NO.2a4 Find whole number quotients up to four dividends and two divisors.
5.NO.2a5 Solve word problems that require multiplication or division.
Progress Indicator: recognizing fractions as one number/one quantity, rather than two numbers (numerator and denominator) and using number lines to represent magnitude of fractions and equivalent /non-equivalent fractions
5.NO.2b1 Add and subtract fractions with unlike denominators by replacing fractions with equivalent fractions (identical denominators).
5.NO.2b2 Add or subtract fractions with unlike denominators.
5.NO.2b3 Multiply a fraction by a whole or mixed number.
5.NO.2b4 Divide unit fractions by whole numbers and whole numbers by unit fractions.
Progress Indicator: using operations and standard algorithms with whole numbers, fractions (unlike denominators), and decimals (to hundredths)
5.NO.2c1 Solve 1 step problems using decimals.

5.NO.2c2 Solve word problems involving the addition, subtraction, multiplication, or division of fractions.
Progress Indicator: using informal and rule-based arguments, evidence, and examples (e.g., estimation, rounding, arrays, visual models, diagrams) to justify mathematical solutions
5-6.NO.3a1 Justify the use of a strategy, rule, or identified characteristic to solve a given problem (e.g., why use a formula to find the area of rectangles).
Progress Indicator: critiquing the mathematical arguments provided by others
5-6.NO.3b1 Use up to two rules to extend a pattern and verify provided responses or select correct answers (e.g., Rules: +3, +2 and table lists pairs, 4:5, 7:7, and 10:9).
5-6.NO.3b2 Explain the selection of rule(s) to use to verify a response. Explain the rules used to verify a solution.
5-6.NO.3b3 Verify provided solutions within word problems (e.g., Sally wanted to give her brother $\frac{1}{2}$ of her books. Her brother only took $\frac{1}{4}$ of the $\frac{1}{2}$ she offered. Sally gave him $\frac{1}{8}$ of all of her books. Is this true?).
5-6.NO.3b4 Critique a set of solutions for a given problem and determine any viable answers.
5-6.NO.3b5 Evaluate the accuracy of statements made based upon provided data.
5th Grade Patterns, Relations, and Functions
Progress Indicator: describing how multiplication or division changes a quantity, including with fractions or decimals
5.PRF.1a1 Determine whether the product will increase or decrease based on the multiplier.
Progress Indicator: distinguishing linear from nonlinear relationships as represented in graphical and tabular representations
5.PRF.1b1 Given 2 patterns involving the same context (e.g., collecting marbles) determine the 1st 5 terms and compare the values.
5.PRF.1b2 When given a line graph representing two arithmetic patterns, identify the relationship between the two.
Progress Indicator: representing, analyzing, extending, and generalizing a variety of patterns using tables, graphs, words, and symbolic rules
5.PRF.2a1 Generate a pattern that follows the provided rule.
Progress Indicator: relating and comparing different forms of representation and identifying functions as linear or nonlinear
5.PRF.2b1 Generate or select a comparison between two graphs from a similar situation.
5th Grade Symbolic Expression
Progress Indicator: using symbols ($=$, $>$, $<$) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations
5.SE.1a1 Given a real-world problem, write an expression using 1 set of parentheses.

6th Grade Mathematics Core Content Connectors

6th Grade Data Analysis, Probability, and Statistics

Progress Indicator: formulating questions about groups larger than classroom groups and comparing different populations or samples

6.DPS.1a2 Identify statistical questions and make a plan for data collection.

Progress Indicator: using representations (e.g., dot plots, scatter plots, line plots) to display data from investigations to describe the shapes of the data

6.DPS.1c2 Collect and graph data: bar graph, line plots, dot plots, histograms.

Progress Indicator: identifying the range, three common measures of central tendency (mean, median, and mode) and interpreting the mean as a fair share and a center of balance

6.DPS.1d2 Solve for mean of a given data set.

6.DPS.1d3 Select statement that matches mean, mode, and spread of data for 1 measure of central tendency for a given data set.

6.DPS.1d4 Find the range of a given data set.

6.DPS.1d5 Explain or identify what the mean represents in a set of data.

6.DPS.1d6 Explain or identify what the mode represents in a set of data.

6.DPS.1d7 Explain or identify what the median represents in a set of data.

Progress Indicator: making claims about populations from data distributions, supporting interpretations on the basis of mean, median, or mode, and the shape of the distribution

6.DPS.1e2 Use measures of central tendency to interpret data including overall patterns in the data.

6th Grade Geometry

Progress Indicator: demonstrating the use of a coordinate system by locating/graphing a given point or polygon using ordered pairs

6.GM.1c4 Locate points on a graph.

6.GM.1c5 Use order pairs to graph given points.

6.GM.1c6 Find coordinate values of points in the context of a situation.

6.GM.1c7 Use coordinate points to draw polygons.

6.GM.1c8 Use coordinate points to find the side lengths of polygons that are horizontal or vertical.

Progress Indicator: solving area, surface area, and volume problems by composing and decomposing figures

6.GM.1d1 Find area of quadrilaterals.

6.GM.1d2 Find area of triangles.

6th Grade Measurement

Progress Indicator: identifying and describing measurable attributes (including area, surface area, volume, fractional units, absolute value with temperature), and selecting appropriate customary or metric units of measure when solving problems

6.ME.1a2 Identify the appropriate formula (i.e., perimeter, area, volume) to use when measuring for different purposes in a real-life context.

Progress Indicator: recognizing relationships among units and using proportional reasoning to convert measurements from one unit to another within the same system

6.ME.1b4 Complete a conversion table for length, mass, time, volume.

6.ME.1b5 Analyze table to answer questions.

Progress Indicator: recognizing how the formulas for area and volume for a variety of shapes and solids are related
6.ME.1c1 Find the area of a 2-dimensional figure and the volume of a 3-dimensional figure.
Progress Indicator: selecting and applying appropriate standard units, tools, and level of precision in real-world measurement problems (e.g., area, surface area, volume, rate)
6.ME.2a2 Solve one step real world measurement problems involving unit rates with ratios of whole numbers when given the unit rate (3 inches of snow falls per hour, how much in 6 hours).
6.ME.2a3 Apply the formula to find the area of triangles.
Progress Indicator: using a variety of strategies (decomposing complex shapes, using formulas and models) to measure area (triangles, quadrilaterals, polygons) and volume (rectangular prisms)
6.ME.2b2 Decompose complex shapes (polygon, trapezoid, pentagon) into simple shapes (rectangles, squares, triangles) to measure area.
6.ME.2b4 Decompose complex 3-D shapes into simple 3-D shapes to measure volume.
6th Grade Numbers and Operations
Progress Indicator: representing integers (positive/negative numbers) and locating them on a number line
6.NO.1d1 Identify numbers as positive or negative.
6.NO.1d2 Locate positive and negative numbers on a number line.
6.NO.1d3 Plot positive and negative numbers on a number line.
6.NO.1d4 Select the appropriate meaning of a negative number in a real-world situation.
6.NO.1d5 Find given points between -10 and 10 on both axis of a coordinate plane.
6.NO.1d6 Label points between -10 and 10 on both axis of a coordinate plane.
Progress Indicator: describing, representing, and comparing absolute value relationships
6.NO.1e1 Determine the meaning of absolute value.
Progress Indicator: recognizing equivalence of representations using fractions, decimals, and percents, and using them solve ratio problems
6.NO.1f1 Find a percent of a quantity as rate per 100.
6.NO.1f2 Write or select a ratio to match a given statement and representation.
6.NO.1f3 Select or make a statement to interpret a given ratio.
6.NO.1f4 Find a missing value (representations, whole numbers, common fractions, decimals to hundredths place, percent) for a given ratio.
6.NO.1f5 Solve unit rate problems involving unit pricing.
Progress Indicator: using exponents and scientific notation to express very large or very small quantities
6.NO.1i1 Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$).
6.NO.1i2 Solve numerical expressions involving whole number exponents.
Progress Indicator: working flexibility with common addition, subtraction, multiplication, and division situations
6.NO.2a6 Solve problems or word problems using up to three-digit numbers and any of the four operations.
Progress Indicator: using operations and standard algorithms with whole numbers, fractions (unlike denominators), and decimals (to hundredths)

6.NO.2c3 Solve one step, addition, subtraction, multiplication, or division problems with fractions or decimals.
6.NO.2c4 Solve word problems involving the addition, subtraction, multiplication, or division of fractions.
6.NO.2c5 Divide multi-digit whole numbers.
Progress Indicator: ordering/comparing integers and representing them on the number line
6.NO.2e1 Determine the difference between two integers using a number line.
6.NO.2e2 Compare two numbers on a number line (e.g., $-2 > -9$).
Progress Indicator: using informal and rule-based arguments, evidence, and examples (e.g., estimation, rounding, arrays, visual models, diagrams) to justify mathematical solutions
5-6.NO.3a1 Justify the use of a strategy, rule, or identified characteristic to solve a given problem (e.g., why use a formula to find the area of rectangles).
Progress Indicator: critiquing the mathematical arguments provided by others
5-6.NO.3b1 Use up to two rules to extend a pattern and verify provided responses or select correct answers (e.g., Rules: $+3$, $+2$ and table lists pairs, 4:5, 7:7, and 10:9).
5-6.NO.3b2 Explain the selection of rule(s) to use to verify a response. Explain the rules used to verify a solution.
5-6.NO.3b3 Verify provided solutions within word problems (e.g., Sally wanted to give her brother $\frac{1}{2}$ of her books. Her brother only took $\frac{1}{4}$ of the $\frac{1}{2}$ she offered. Sally gave him $\frac{1}{8}$ of all of her books. Is this true?).
5-6.NO.3b4 Critique a set of solutions for a given problem and determine any viable answers.
5-6.NO.3b5 Evaluate the accuracy of statements made based upon provided data.
6th Grade Patterns, Relations, and Functions
Progress Indicator: describing how multiplication or division changes a quantity, including with fractions or decimals
6.PRF.1a2 Determine whether or not the quotient will increase or decrease based on the divisor.
Progress Indicator: comparing two rates and evaluating them for a given situation (e.g., best value)
6.PRF.1c1 Describe the ratio relationship between two quantities for a given situation.
6.PRF.1c2 Represent proportional relationships on a line graph.
Progress Indicator: using symbolic equations to summarize how the quantity of something changes
6.PRF.1d1 Solve real world single step linear equations.
Progress Indicator: representing, analyzing, extending, and generalizing a variety of patterns using tables, graphs, words, and symbolic rules
6.PRF.2a2 Use variables to represent numbers and write expressions when solving real-world problems.
6.PRF.2a3 Use variables to represent two quantities in a real-world problem that change in relationship to one another.
6.PRF.2a4 Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
Progress Indicator: relating and comparing different forms of representation and identifying functions as linear or nonlinear
6.PRF.2b2 Using provided table with numerical patterns, form ordered pairs.

6.PRF.2b3 Complete a statement that describes the ratio relationship between two quantities.
6.PRF.2b4 Determine the unit rate in a variety of contextual situations.
6.PRF.2b5 Use ratios and reasoning to solve real-world mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).
6th Grade Symbolic Expression
Progress Indicator: using symbols ($=$, $>$, $<$) to compare whole numbers, fractions, or decimals; write equations; and express inverse or related operations
6.SE.1a2 Given a real-world problem, write an equation using 1 set of parentheses.
6.SE.1a3 Write expressions for real-world problems involving one unknown number.
6.SE.1a4 Given a real-world problem, write an inequality.
Progress Indicator: writing, interpreting, and using expressions, equations, and inequalities (including using brackets, parentheses, or braces)
6.SE.1b1 Evaluate whether or not both sides of an equation are equal.
6.SE.1b2 Use properties to produce equivalent expressions.

7th Grade Mathematics Core Content Connectors

7th Grade Data Analysis, Probability, and Statistics

Progress Indicator: distinguishing among populations, censuses, and sampling

7.DPS.1b1 Determine sample size to answer a given question.

Progress Indicator: displaying and interpreting univariate data using dot plots, histograms, and circle graphs

7.DPS.1g1 Graph continuous data using line graphs, histograms, or dot plots.

Progress Indicator: using box plots, interquartile range, mean absolute deviation, range, and the concept of outliers to characterize the distribution (variability) of univariate data

7.DPS.1i1 Solve for the median of a given data set.

7.DPS.1i2 Identify the range (high/low), median (middle), mean, or mode of a given data set.

Progress Indicator: comparing two unequal distributions of data using number of data points, measures of central tendency, shape, and variability (numerical data), and two-way tables (categorical variables)

7.DPS.1j1 Make or select a statement to compare the distribution of 2 data sets.

Progress Indicator: supporting claims about the results of investigations (e.g., coordinating among the measures of central tendency and variability)

7.DPS.1k1 Analyze graphs to determine or select appropriate comparative inferences about two samples or populations.

Progress Indicator: conducting simple probability experiments and expressing results in terms of relative frequencies or proportions as first estimate of probability

7.DPS.2a1 Conduct simple probability experiments.

Progress Indicator: describing and representing (e.g., tree diagrams) all possible outcomes (sample space) and the theoretical probabilities of each outcome (as proportion of a specific outcome relative to all possible outcomes) in simple probability experiments

7.DPS.2b1 Identify sample space for a single event (coin, spinner, die).

Progress Indicator: describing the probability of events as being certain, likely, equally likely, unlikely, or impossible

7.DPS.2d1 Describe the probability of events as being certain or impossible, likely, less likely or equally likely.

7.DPS.2d2 State the theoretical probability of events occurring in terms of ratios (words, percentages, decimals).

Progress Indicator: identifying sample spaces for multi-stage probability experiments (independent events) and determining the theoretical probabilities of specific event combinations

7.DPS.2d3 Using a tree diagram, represent all possible outcomes of a situation, with up to 3 compound events with 2 or 3 possibilities per category (selecting the color of shirt, pant, type of shoes).

7.DPS.2d4 Make a prediction regarding the probability of an event occurring; conduct simple probability experiments.

7.DPS.2d5 Compare actual results of simple experiment with theoretical probabilities.

Progress Indicator: designing and conducting multi-stage (compound) probability experiments (independent events) and comparing the results with theoretical probabilities

7.DPS.2e1 Determine the theoretical probability of multistage probability experiments (2 coins, 2

dice).
7.DPS.2e2 Collect data from multistage probability experiments (2 coins, 2 dice).
7.DPS.2e3 Compare actual results of multistage experiment with theoretical probabilities.
7th Grade Geometry
Progress Indicator: constructing or drawing geometric shapes from given conditions (e.g., draw triangles given three angle or side measures; change scale)
7.GM.1e1 Construct or draw plane figures using properties.
Progress Indicator: solving real-world area, surface area, and volume problems using different strategies (formulas and decomposing figures)
7.GM.1h1 Add the area of each face of a prism to find surface area of three-dimensional objects.
7.GM.1h2 Find the surface area of three-dimensional figures using nets of rectangles or triangles.
7.GM.1h3 Find area of plane figures and surface area of solid figures (quadrilaterals).
7.GM.1h4 Find area of an equilateral, isosceles, and scalene triangle.
7.GM.1h5 Describe the two-dimensional figures that result from a decomposed three-dimensional figure.
7th Grade Measurement
Progress Indicator: applying proportional reasoning to problems with ratios of length, area, and quantities measured in like or different units
7.ME.1d1 Solve problems that use proportional reasoning with ratios of length and area.
Progress Indicator: selecting and applying appropriate standard units and tools to measure to an appropriate level of precision
7.ME.2c1 Solve one step real world measurement problems involving area, volume, or surface area of two- and three-dimensional objects.
Progress Indicator: using various strategies (decomposing complex shapes, using formulas) to measure volume (cones, cylinders, spheres) and area and circumference of circles
7.ME.2d1 Apply formula to measure area and circumference of circles.
Progress Indicator: solving simple problems involving scale factors, rates, and derived measures
7.ME.2e1 Solve one step real world problems related to scaling.
7.ME.2e2 Solve one step problems involving unit rates associated with ratios of fractions.
7th Grade Numbers and Operations
Progress Indicator: representing and using integers; comparing and expressing absolute value and additive inverse relationships
7.NO.1g1 Identify the additive inverse of a number (e.g., -3 and +3).
7.NO.1g2 Identify the difference between two given numbers on a number line using absolute value.
Progress Indicator: recognizing and modeling fractions, decimals, and percents as different representations of rational numbers
7.NO.1h1 Identify an equivalent fraction, decimal and percent when given one of the three numbers.
Progress Indicator: describing proportional relationships and solving related problems
7.NO.2f1 Identify the proportional relationship between two quantities.
7.NO.2f2 Determine if two quantities are in a proportional relationship using a table of equivalent ratios or points graphed on a coordinate plane.
7.NO.2f3 Find unit rates given a ratio.

7.N0.2f4 Use a rate of change or proportional relationship to determine the points on a coordinate plane.
7.N0.2f5 Use proportions to solve ratio problems.
7.N0.2f6 Solve word problems involving ratios.
Progress Indicator: using operations involving percents and percent increase/decrease
7.N0.2h1 Find percents in real world contexts.
7.N0.2h2 Solve one step percentage increase and decrease problems.
Progress Indicator: using operations with rational numbers; representing rational numbers and approximations of irrational numbers on a number line
7.N0.2i1 Solve multiplication problems with positive/negative numbers.
7.N0.2i2 Solve division problems with positive/negative numbers.
Progress Indicator: using stated assumptions, definitions, patterns, and previously established results in constructing mathematical arguments
7-8.N0.3c1 Use the rules for mathematical operations to verify the results when more than one operation is required to solve a problem.
7-8.N0.3c2 Explain the selection of rule(s) to use to verify a response.
7-8.N0.3c3 Analyze provided information (e.g., a graph) to describe the relationship between two quantities.
7-8.N0.3c4 Construct an argument using established data and any given pattern within that data.
7-8.N0.3c5 Explain each step to solve a problem (e.g., explain how to solve a multi-step equation).
7th Grade Patterns, Relations, and Functions
Progress Indicator: representing and computing unit rates associated with ratios of lengths, areas, and other quantities measured in like or different units
7.PRF.1e1 Determine unit rates associated with ratios of lengths, areas, and other quantities measured in like units.
7.PRF.1e2 Represent proportional relationships on a line graph.
Progress Indicator: identifying essential quantitative relationship(s) in a situation and using symbolic expressions to represent it and draw reasonable conclusions from it
7.PRF.1f1 Use proportional relationships to solve multistep percent problems in real world situations.
Progress Indicator: modeling, solving, and explaining contextualized problems using various representations such as graphs, tables, functions, and equations
7.PRF.1g1 Solve real world multi step problems using whole numbers.
7.PRF.1g2 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities.
Progress Indicator: representing, analyzing, extending, and generalizing a variety of patterns using tables, graphs, words, and symbolic rules
7.PRF.2a5 Use variables to represent two quantities in a real-world problem that change in relationship to one another.
Progress Indicator: solving linear equations and formulating and explaining reasoning about expressions and equations
7.PRF.2d1 Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers.

7th Grade Symbolic Expression

Progress Indicator: writing and interpreting mathematical expressions, equations, and inequalities that correspond to given situations

7.SE.1f1 Set up equations with 1 variable based on real world problems.

7.SE.1f2 Solve equations with 1 variable based on real world problems.

7.SE.1f3 Add and subtract linear expressions.

7.SE.1f4 Factor and expand linear expressions.

8th Grade Mathematics Core Content Connectors

8th Grade Data Analysis, Probability, and Statistics

Progress Indicator: formulating questions about groups larger than classroom groups, comparing different populations or samples, and involving two variables

8.DPS.1f1 Formulate a research question to study.

8.DPS.1f2 Identify two variables to study in a given a research question.

8.DPS.1f3 Construct a two-way table summarizing data on two categorical variables collected from the same subjects; identify possible association between the two variables.

Progress Indicator: displaying and interpreting univariate data using dot plots, histograms, and circle graphs

8.DPS.1g2 Graph data using line graphs, histograms, or box plots.

Progress Indicator: displaying data in scatter plots and investigating the association between the variables

8.DPS.1h1 Graph bivariate data using scatter plots and identify possible associations between the variables.

Progress Indicator: using box plots, interquartile range, mean absolute deviation, range, and the concept of outliers to characterize the distribution (variability) of univariate data

8.DPS.1i3 Using box plots and scatter plots, identify data points that appear to be outliers.

8.DPS.1i4 Identify outliers, range, mean, median, and mode.

Progress Indicator: comparing two unequal distributions of data using number of data points, measures of central tendency, shape, and variability (numerical data), and two-way tables (categorical variables)

8.DPS.1j2 Make or select an appropriate statement based upon two unequal data sets using measure of central tendency and shape.

Progress Indicator: supporting claims about the results of investigations (e.g., coordinating among the measures of central tendency and variability)

8.DPS.1k2 Analyze displays of bivariate data to develop or select appropriate claims about those data.

Progress Indicator: designing and conducting multi-stage (compound) probability experiments (independent events) and comparing the results with theoretical probabilities

8.DPS.2e4 Determine the theoretical probability of multistage probability experiments (2 coins, 2 dice).

8.DPS.2e5 Collect data from multistage probability experiments (2 coins, 2 dice).

8.DPS.2e6 Compare actual results of multistage experiment with theoretical probabilities.

Progress Indicator: using simple lines to model association between two numerical variables in a bivariate data set

8.DPS.2g1 Distinguish between a linear and non-linear association when analyzing bivariate data on a scatter plot.

8.DPS.2g2 Interpret the slope and they-intercept of a line in the context of a problem.

8th Grade Geometry

Progress Indicator: recognizing and demonstrating rotations, reflections, and translations using multiple contexts (e.g., using coordinates, models, drawings, technology)

8.GM.1f1 Recognize a rotation, reflection, or translation of a figure.
8.GM.1f2 Identify a rotation, reflection, or translation of a plane figure when given coordinates.
Progress Indicator: demonstrating congruence and similarity using a variety of two-dimensional figures
8.GM.1g1 Recognize congruent and similar figures.
Progress Indicator: exploring and explaining angle relationships (e.g., pairs of parallel lines cut by a transversal, including perpendicular lines)
8.GM.1i1 Identify supplementary angles.
8.GM.1i2 Identify complimentary angles.
8.GM.1i3 Identify adjacent angles.
8.GM.1i4 Use angle relationships to find the value of a missing angle.
Progress Indicator: applying the Pythagorean Theorem
8.GM.1j1 Find the hypotenuse of a two-dimensional right triangle (Pythagorean Theorem).
8.GM.1j2 Find the missing side lengths of a two-dimensional right triangle (Pythagorean Theorem).
8th Grade Measurement
Progress Indicator: exploring what happens to 2 and 3-dimensional measurements (such as surface area, area, and volume) when the figure is changed in some way (e.g., scale drawings)
8.ME.1e1 Describe the changes in surface area, area, and volume when the figure is changed in some way (e.g., scale drawings).
8.ME.1e1 Compare area and volume of similar figures.
Progress Indicator: using various strategies (decomposing complex shapes, using formulas) to measure volume (cones, cylinders, spheres) and area and circumference of circles
8.ME.2d2 Apply the formula to find the volume of 3-dimensional shapes (i.e., cubes, spheres, and cylinders).
Progress Indicator: applying the Pythagorean Theorem to determine lengths/distances in real-world situations
8.ME.2f1 Apply the Pythagorean Theorem to determine lengths/distances in real-world situations.
8th Grade Numbers and Operations
Progress Indicator: using exponents and scientific notation to express very large or very small quantities
8.NO.1i1 Convert a number expressed in scientific notation up to 10,000.
Progress Indicator: Making interpretations and comparisons of scientific notation produced by technology or appearing in various media
8.NO.1j1 Perform operations with numbers expressed in scientific notation.
Progress Indicator: distinguishing rational numbers (terminating and repeating) from irrational numbers (non-terminating and non-repeating), and recognizing that together they form the real number system and that both can be represented on the number line
8.NO.1k1 Identify π as an irrational number.
8.NO.1k2 Round irrational numbers to the hundredths place.
8.NO.1k3 Use approximations of irrational numbers to locate them on a number line.
Progress Indicator: using operations with rational numbers; representing rational numbers and approximations of irrational numbers on a number line

8.NO.2i3 Solve one step addition, subtraction, multiplication, division problems with fractions, decimals, and positive/negative numbers.
8.NO.2i4 Solve two step addition, subtraction, multiplication, and division problems with fractions, decimals, or positive/negative numbers.
Progress Indicator: using stated assumptions, definitions, patterns, and previously established results in constructing mathematical arguments
7-8.NO.3c1 Use the rules for mathematical operations to verify the results when more than one operation is required to solve a problem.
7-8.NO.3c2 Explain the selection of rule(s) to use to verify a response.
7-8.NO.3c3 Analyze provided information (e.g., a graph) to describe the relationship between two quantities.
7-8.NO.3c4 Construct an argument using established data and any given pattern within that data.
7-8.NO.3c5 Explain each step to solve a problem (e.g., explain how to solve a multi-step equation).
8th Grade Patterns, Relations, and Functions
Progress Indicator: representing and computing unit rates associated with ratios of lengths, areas, and other quantities measured in like or different units
8.PRF.1e2 Represent proportional relationships on a line graph.
Progress Indicator: identifying essential quantitative relationship(s) in a situation and using symbolic expressions to represent it and draw reasonable conclusions from it
8.PRF.1f2 Describe or select the relationship between the two quantities given a line graph of a situation.
Progress Indicator: modeling, solving, and explaining contextualized problems using various representations such as graphs, tables, functions, and equations
8.PRF.1g3 Solve linear equations with 1 variable.
8.PRF.1g4 Solve systems of two linear equations in two variables and graph the results.
8.PRG.1g5 Solve real world and mathematical problems leading to two linear equations in two variables.
Progress Indicator: relating and comparing different forms of representation and identifying functions as linear or nonlinear
8.PRF.2c1 Given two graphs, describe the function as linear and not linear.
Progress Indicator: using functions to describe quantitative relationships
8.PRF.2e1 Distinguish between functions and non-functions, using equations, graphs, or tables.
8.PRF.2e2 Identify the rate of change (slope) and initial value (y-intercept) from graphs.
8.PRF.2e3 Given a verbal description of a situation, create or identify a graph to model the situation.
8.PRF.2e4 Given a graph of a situation, generate a description of the situation.
8.PRF.2e5 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
8th Grade Symbolic Expression
Progress Indicator: writing and interpreting mathematical expressions, equations, and inequalities that correspond to given situations
8.SE.1f5 Use properties of integer exponents to produce equivalent expressions.

High School Mathematics Core Content Connectors

High School Data Analysis, Probability, and Statistics

Progress Indicator: designing and conducting different kinds of studies using categorical and numerical data, explain results, and use data to estimate a population mean or proportion: a. observational studies (e.g., traffic patterns at an intersection near the school); b. sample surveys (a survey of student nutritional habits); c. simple comparative experiments (e.g., comparisons of water and fertilizer treatments in a plant growth experiment)

H.DPS.1a1 Design study using categorical and continuous data, including creating a question, identifying a sample, and making a plan for data collection.

Progress Indicator: representing data with plots on the real number line (dot plots, histograms, box plots)

H.DPS.1b1 Complete a graph given the data, using dot plots, histograms, or box plots.

Progress Indicator: analyzing and summarizing the data resulting from studies using statistical measures appropriate to shape of the data (median, mean) and spread (interquartile range, standard deviation), and using data to support inferences (population parameters, sample size) or explain possible outliers

H.DPS.1c1 Use descriptive stats; range, median, mode, mean, outliers/gaps to describe the data set.

H.DPS.1c2 Compare means, median, and range of 2 sets of data.

H.DPS.1c3 Determine what inferences can be made from statistics.

Progress Indicator: representing and interpreting data (graphs, scatter plots) to explain how variables are related, or to fit a function to the data

H.DPS.1d1 Represent data on a scatter plot to describe and predict.

H.DPS.1d2 Select an appropriate statement that describes the relationship between variables.

H.DPS.1d3 Make or select an appropriate statement(s) about findings.

H.DPS.1d4 Apply the results of the data to a real-world situation.

Progress Indicator: exploring (framing effects) the degree to which we rate something as "good" or "bad"/"desirable" or "undesirable" when numerical information is presented positively (75% lean) or negatively (25% fat)

H.DPS.2b1 Identify and describe the degree to which something is rated "good" or "bad"/desirable or undesirable based on numerical information.

Progress Indicator: designing and conducting multi-stage (compound) probability experiments (independent events) and comparing the results with theoretical probabilities

H.DPS.2c1 Determine the theoretical probability of multistage probability experiments.

H.DPS.2c2 Collect data from multistage probability experiments.

H.DPS.2c3 Compare actual results of multistage experiment with theoretical probabilities.

Progress Indicator: constructing and interpreting two-way frequency tables when two categories are associated with each object being classified

H.DPS.2d1 Select or make an appropriate statement based on a two-way frequency table.

Progress Indicator: researching and finding real-world examples and explaining the concept of conditional probability (e.g., compare the chances of having lung cancer if you are a smoker with the chances of being a smoker if you have lung cancer)

H.DPS.2e1 Select or make an appropriate statement based on real world examples of conditional probability.

High School Geometry

Progress Indicator: applying the Pythagorean Theorem

H.GM.1a1 Find the hypotenuse of a two-dimensional right triangle (Pythagorean Theorem).

H.GM.1a2 Find the missing side lengths of a two-dimensional right triangle (Pythagorean Theorem).

H.GM.1a3 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Progress Indicator: using congruence and similarity relationships to solve problems, including triangle congruence relationships

H.GM.1b1 Use definitions to demonstrate congruency and similarity in figures.

Progress Indicator: applying understanding of rotations, reflections, and translations to construct figures (e.g., using coordinates, models, drawings, transparencies, dynamic geometry software)

H.GM.1c1 Construct, draw or recognize a figure after its rotation, reflection, or translation.

Progress Indicator: applying scale factors in solving multiple similarity problems, including transformations in the coordinate plane and similarity relationships with right triangles

H.GM.1d1 Use the reflections, rotations, or translations in the coordinate plane to solve problems with right angles.

Progress Indicator: making various geometric constructions, including use of dynamic geometry software, and creating informal proofs of relationships (lines and angles, circles, polygons)

H.GM.1e1 Make formal geometric constructions with a variety of tools and methods.

High School Measurement

Progress Indicator: making decisions about units and scales that are appropriate for problem-solving situations within or across mathematics disciplines or real-world contexts

H.ME.1a1 Determine the necessary unit(s) to use to solve real world problems.

H.ME.1a2 Solve real world problems involving units of measurement.

Progress Indicator: investigating the results when linear dimensions of objects change by some factor (e.g., area and volume change disproportionately: area in proportion to the square of the factor and volume in proportion to its cube)

H.ME.1b1 Describe the relationship between the attributes of a figure and the changes in the area or volume when 1 attribute is changed.

H.ME.1b2 Solve a linear equation to find a missing attribute given the area, surface area, or volume and the other attribute.

Progress Indicator: analyzing levels of precision, accuracy, and approximate error in measurement situations

H.ME.2a1 Describe the accuracy of measurement when reporting quantity (you can lessen your limitations by measuring precisely).

Progress Indicator: using techniques of measurement, estimating, or calculating to compare or analyze two- and three-dimensional figures and their parts

H.ME.2b1 Determine the dimensions of a figure after dilation.

H.ME.2b2 Determine if two figures are similar.

H.ME.2b3 Describe or select why two figures are or are not similar.

H.ME.2b4 Apply the formula to the area of a sector (e.g., area of a slice of pie).

H.ME.2b5 Apply the formula of geometric figures to solve design problems (e.g., designing an object or structure to satisfy physical restraints or minimize cost).

High School Numbers and Operations

Progress Indicator: using exponents and scientific notation to represent quantities and expressions

H.NO.1a1 Represent quantities and expressions that use exponents.

H.NO.1a2 Explain the influence of an exponent on the location of a decimal point in a given number.

H.NO.1a3 Convert a number expressed in scientific notation.

Progress Indicator: using operations with rational numbers; representing rational numbers and approximations of irrational numbers on a number line

H.NO.2a1 Solve simple equations using rational numbers with one or more variables.

H.NO.2a2 Understand the definition of a polynomial.

H.NO.2a3 Understand the concepts of combining like terms and closure.

H.NO.2a4 Add, subtract, and multiply polynomials and understand how closure applies under these operations.

H.NO.2.a5 Understand and apply the Remainder Theorem.

H.NO.2a6 Find the zeros of a polynomial when the polynomial is factored.

Progress Indicator: operating with irrational and complex numbers

H.NO.2b1 Explain the pattern for the sum or product for combinations of rational and irrational numbers.

Progress Indicator: identifying exponential situations and applying the laws and properties of exponents in simplifying expressions and solving equations

H.NO.2c1 Simplify expressions that include exponents.

H.NO.2c2 Rewrite expressions that include rational exponents.

Progress Indicator: comparing the effectiveness of two plausible arguments, distinguishing correct logic or reasoning from that which is flawed, and if there is a flaw in an argument, explaining it

H.NO.3a1 Verify data displays are interpreted accurately within a response.

H.NO.3a2 Rewrite mathematical statements (e.g., an expression) in multiple forms.

H.NO.3a3 Identify an appropriate argument based upon provided data.

H.NO.3a4 Compare the steps using different strategies to solve a problem (compare two strategies to decide best way to solve problem).

H.NO.3a5 Evaluate provided arguments or logic based upon provided data.

High School Patterns, Relations, and Functions

Progress Indicator: approximating, calculating, and interpreting rates of change using graphical and numerical data

H.PRF.1a1 Interpret the rate of change using graphical representations.

Progress Indicator: exploring how the rate of change of something depends on how much there is of something else (as the rate of change of speed is proportional to the amount of force acting)

H.PRF.1b1 In a linear situation using graphs or numbers, predicts the change in rate based on a given change in one variable (e.g., If I have been adding sugar at a rate of 1T per cup of water. What happens to my rate if I switch to 2T of sugar for every cup of water?).

Progress Indicator: creating mathematical models, using rules and relationships to describe and predict objects and events in the real world

H.PRF.1c1 Select the appropriate graphical representation of a linear model based on real world events.

Progress Indicator: interpreting and rewriting a variety of expressions or functions to solve problems
H.PRF.2a1 Translate an algebraic expression into a word problem.
H.PRF.2a2 Factor a quadratic expression.
H.PRF.2a3 Given a quadratic expression, explain the meaning of the zeros graphically. That is for an expression $(x - a)(x - c)$, a and c correspond to the x -intercepts (if a and c are real).
H.PRF.2a4 Use the formula to solve real world problems such as calculating the height of a tree after n years given the initial height of the tree and the rate the tree grows each year.
H.PRF.2a5 Rewrite rational expressions, $a(x)/b(x)$, in the form $q(x) + r(x)/b(x)$ by using factoring, long division, or synthetic division.
H.PRF.2a6 Write and use a system of equations and/or inequalities to solve a real-world problem.
Progress Indicator: creating equations and inequalities (in one or two variables) and use them to solve problems and graph solutions
H.PRF.2b1 Translate a real-world problem into a one variable equation.
H.PRF.2b2 Solve equations with one or two variables using equations or graphs.
H.PRF.2b3 Transform a quadratic equation written in standard form to an equation in vertex form $(x - p) = q^2$ by completing the square.
H.PRF.2b4 Derive the quadratic formula by completing the square on the standard form of a quadratic equation.
H.PRF.2b5 Solve quadratic equations in one variable by simple inspection, taking the square root, factoring, and completing the square.
H.PRF.2b6 Solve systems of equations using the elimination method (sometimes called linear combinations).
H.PRF.2b7 Solve a system of equations by substitution (solving for one variable in the first equation and substitution it into the second equation).
H.PRF.2b8 Solve systems of equations using graphs.
H.PRF.2b9 Solve a system containing a linear equation and a quadratic equation in two variables graphically and symbolically.
H.PRF.2b10 Understand that all solutions to an equation in two variables are contained on the graph of that equation.
H.PRF.2b11 Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary for non-inclusive inequalities.
H.PRF.2b12 Graph the solution set to a system of linear inequalities in two variables as the intersection of their corresponding half-planes.
Progress Indicator: using trends that follow a pattern and are described mathematically to make generalizations or predictions
H.PRF.2c1 Make predictions based on a given model (for example, a weather model, data for athletes over years).
Progress Indicator: analyzing functions (using technology) by investigating significant characteristics (e.g. intercepts, asymptotes)
H.PRF.2d1 Explain why the intersection of $y = f(x)$ and $y = g(x)$ is the solution of $f(x) = g(x)$ for any combination of linear or exponential. Find the solution(s) by: Using technology to graph the equations and determine their point of intersection, Using tables of values, or Using successive approximations that become closer and closer to the actual value.